EXERCISES

For more practice, see *Extra Practice.*

Practice and Problem Solving

A Practice by Example

Example 1 (page 440)

Algebra **Find the geometric mean of each pair of numbers.**

1. 4 and 9 **2.** 4 and 10 **3.** 4 and 12 **4.** 3 and 48

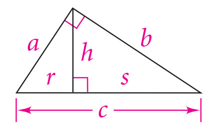
5. 7 and 56 **6.** 5 and 125 **7.** 9 and 24 **8.** 7 and 9

Example 2 (page 441)

Algebra **Refer to the figure to complete each proportion.**

9. $\frac{r}{h} = \frac{h}{\square}$ **10.** $\frac{c}{a} = \frac{a}{\square}$ **11.** $\frac{\square}{b} = \frac{b}{s}$

12. $\frac{r}{\square} = \frac{\square}{c}$ **13.** $\frac{r}{h} = \frac{\square}{s}$ **14.** $\frac{s}{b} = \frac{\square}{c}$



Algebra **Solve for x.**

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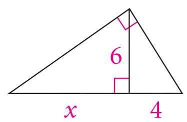

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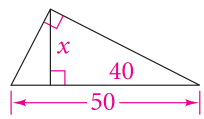

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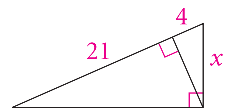

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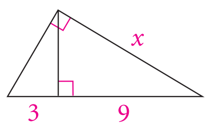

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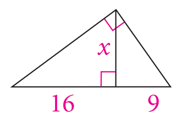

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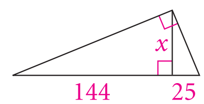
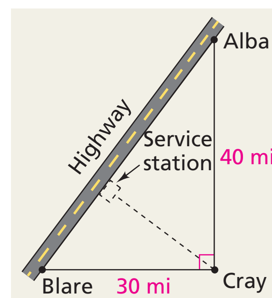


Example 3 (page 441)

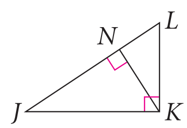
21. a. Civil Engineering Study the plan at the right. A service station will be built on the highway, and a road will connect it with Cray. How far from Blare should the service station be located so that the proposed road will be perpendicular to the highway?

b. How long will the new road be?



B Apply Your Skills

22. Complete: $\triangle JKL \sim \triangle \underline{\ ?\ } \sim \triangle \underline{\ ?\ }$



23. a. The altitude to the hypotenuse of a right triangle divides the hypotenuse into segments 2 cm and 8 cm long. Find the length h of the altitude.

b. Drawing Use the value you found for h in part (a), along with the lengths 2 cm and 8 cm, to draw the right triangle accurately.

c. Writing Explain how you drew the triangle in part (b).

24. a. Open-Ended Draw a right triangle so that the altitude from the right angle to the hypotenuse bisects the hypotenuse.

b. How does the length of the altitude compare with the lengths of the segments of the hypotenuse? Explain.

25. Coordinate Geometry $\overline{CD}$ is the altitude to the hypotenuse of right $\triangle ABC$. The coordinates of A, D, and B are $(4, 2)$, $(4, 6)$, and $(4, 15)$, respectively. Find all possible coordinates of point C.

Reading Math

"Respectively" in Exercise 25 means you match the lists in the order named: $A(4, 2)$, $D(4, 6)$, $B(4, 15)$.

Algebra **Find the geometric mean of each pair of numbers.**

26. 3 and 16 **27.** 4 and 49 **28.** $\sqrt{8}$ and $\sqrt{2}$ **29.** $\sqrt{28}$ and $\sqrt{7}$

30. $\frac{1}{2}$ and 2 **31.** 5 and 1.25 **32.** 1 and 1000 **33.** 11 and 1331

Algebra **Find the values of the variables.**

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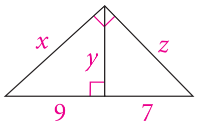

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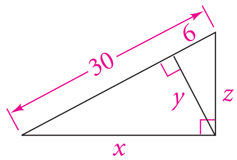

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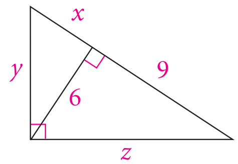
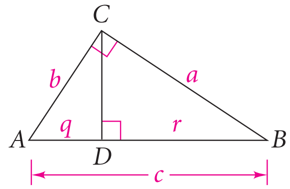


37. Algebra The altitude to the hypotenuse of a right triangle divides the hypotenuse into segments with lengths in the ratio 1 : 2. The length of the altitude is 8. How long is the hypotenuse?

Proof **38. Pythagorean Theorem** You can use Corollary 2 to Theorem 8-3 to prove the Pythagorean Theorem. Complete the following proof.

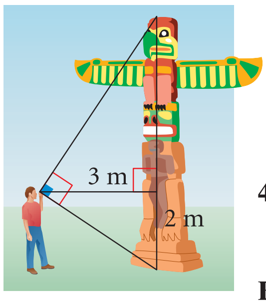


Given: Right $\triangle ABC$ with altitude $\overline{CD}$

Prove: $c^2 = a^2 + b^2$

Statements	Reasons
1. Right $\triangle ABC$ with altitude $\overline{CD}$	**a.** ___?___
2. $\frac{c}{a} = \frac{a}{r}, \frac{c}{b} = \frac{b}{q}$	**b.** ___?___
3. $cr = a^2, cq = b^2$	**c.** ___?___
4. $cr + cq = a^2 + b^2$	**d.** ___?___
5. $c(r + q) = a^2 + b^2$	**e.** ___?___
6. $r + q = c$	**f.** ___?___
7. $c^2 = a^2 + b^2$	**g.** ___?___

39. Indirect Measurement To estimate the height of a totem pole, Jorge uses a small square of plastic. He holds the square up to his eyes and walks backward from the pole. He stops when the bottom of the pole lines up with the bottom edge of the square and the top of the pole lines up with the top edge of the square. Jorge's eye level is about 2 m from the ground. He is about 3 m from the pole. Estimate the height of the totem pole.



Exercise 39

40. The length of the shorter leg of a 30°-60°-90° triangle is 10 cm. Find the length of the altitude to the hypotenuse.

For a right triangle, denote lengths as follows: ℓ_1 and ℓ_2 the legs, h the hypotenuse, a the altitude, and h_1 and h_2 the hypotenuse segments determined by the altitude. For the two given measures, find the other four. Use simplest radical form.

41. $\ell_1 = 3, \ell_2 = 4$ **42.** $h_1 = 4, h_2 = 9$ **43.** $a = 6, h_1 = 6$ **44.** $\ell_1 = 5, a = 4$

45. $h = 13, \ell_2 = 12$ **46.** $\ell_1 = 4, h_1 = 3$ **47.** $a = 8, h_1 = 16$ **48.** $h_1 = 3, \ell_2 = 6\sqrt{3}$

C Challenge

49. a. Lauren thinks she has found a new corollary: The product of the lengths of the two legs of a right triangle is equal to the product of the lengths of the hypotenuse and the altitude to the hypotenuse. Draw a figure for this corollary. Write the *Given* information and what you are to *Prove*.

b. Critical Thinking Is Lauren's corollary true? Explain.

Algebra **Find the value of x.**

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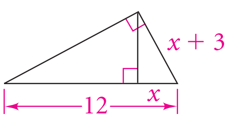

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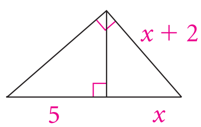

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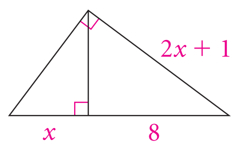


Each Pythagorean triple below represents the lengths of the sides of a right triangle. For each triangle, find the length of the altitude to the hypotenuse.

53. 3, 4, 5 **54.** 5, 12, 13 **55.** 8, 15, 17 **56.** 20, 21, 29

Standardized Test Prep

Multiple Choice

57. What is the geometric mean of 12 and 18?

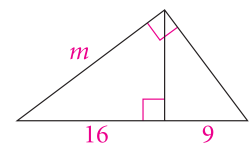
A. 1.5 **B.** $\sqrt{6}$ **C.** 15 **D.** $6\sqrt{6}$

58. What is the geometric mean of 2 and 36?

F. 17 **G.** $6\sqrt{2}$ **H.** 38 **I.** $2\sqrt{6}$

59. Solve for *m*.

A. 7 **B.** 15
C. 20 **D.** 25



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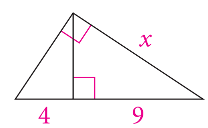
60. The altitude to the hypotenuse of a right triangle divides the hypotenuse into segments of lengths 5 and 15. What is the length of the altitude?

F. 3 **G.** 10 **H.** $5\sqrt{3}$ **I.** $5\sqrt{5}$

Short Response

61. a. Explain how you could solve for *x*.
b. What is the value of *x*?



Mixed Review

Lesson 8-3

If the triangles are similar, (a) write a similarity statement and (b) name the postulate or theorem you used. If the triangles are not similar, write *not similar*.

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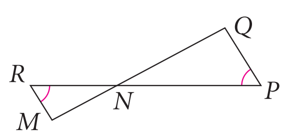

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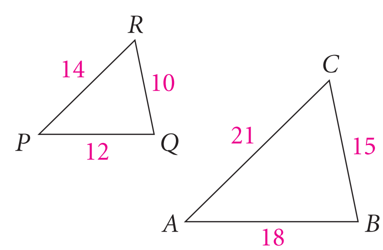

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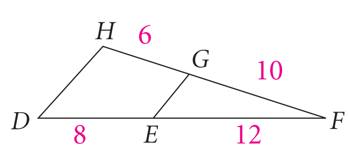

Lesson 7-1 **Algebra** **Solve for the variables in each parallelogram.**

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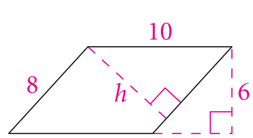

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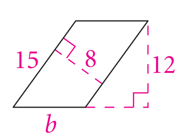
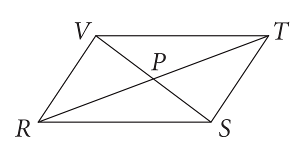


Lesson 6-2 **Algebra** **Find the values of *x* and *y* in ▱*RSTV*.**



67. $RP = 2x, PT = y + 2, VP = y, PS = x + 3$

68. $RP = 4x, PT = 3y - 3, VP = 2x + 3, PS = y + 6$

69. $RV = 2x + 3, VT = 5x, TS = y + 5, SR = 4y - 1$